1 Introduction

The number of existing publications that analyse and argue for the potential of different WASH interventions to reduce the prevalence of diarrhoeal diseases is considerable and diverse. There are articles that argue for the use of interventions based on their effectiveness, their cost-benefit ratio, their cost-effectiveness, and on grounds of the soundness of their methodology. WES specialists in UNICEF offices may not have the time or facilities to keep up with recent developments. With the International Year of Sanitation ahead of us this document’s purpose is to provide a compilation of the recent evidence based literature and approach based accounts for utilizing WASH interventions to combat the prevalence of diarrhoea diseases in the developing world.

This document focuses on hygiene and sanitation, but also discusses water quality interventions. It does not claim to be inclusive, but the presented recent evidence does have the potential to challenge current local WASH strategies and hopefully results in debates about ‘the right way of doing things’ in the WASH sector.

Firstly, section 2 discusses the effectiveness of interventions to reduce diarrhoea, where after section 3 presents the results of recent benefit-costs analysis. The following section 4 brings together recent cost-effectiveness data. Section 5 focuses on social-marketing for hand washing and sanitation, and part 6 briefly introduces the merits of Community-Led Total Sanitation.

The central conclusion of this document in section 7 states the portfolio of justifications for Governments, Donors, NGO’s and other partners to use WASH interventions to reduce diarrhoea morbidity is substantial, but that exactly those justifications are not arguments that would drive non-compliers to start improving their health. On the contrary, instead of believing in the power of the “economic rational” argument, it becomes clear it is paramount to start drawing upon mechanisms that impinge on the power of a different rationality in order to trigger processes of change. Methodologies that have captured this driver of change are available and have shown to be effective indeed.

Annex 1 provides a categorized list of suggested readings used in the core of this document.

With publications that have not been captured and new articles being published every month, the purpose of the paper requires periodical re-crafting. This document can therefore be labelled as being a “working document”: with preferably input from across UNICEF offices.

Your feedback on this document is highly appreciated.
2 Risk Reduction

To what extent do different WASH interventions actually reduce the risk for people to contract diarrhoeal diseases? A recent systematic review and meta-analysis of Fewtrell and colleagues found a strong consistency in the effectiveness of WASH interventions (Fewtrell et al 2005).

Chart 1 shows that all investigated interventions are effective and, moreover, hand washing with soap (HWWS) proves to be the most effective intervention to reduce diarrhoea morbidity (44%). That figure supports a recent systematic review focussed on the effect of HWWS (42%) (Curtis and Cairncross 2003).

Chart 1 also highlights the key role point-of-use water treatment could play in reducing diarrhoea (39%), which is even an underestimate compared to the result of a recent Cochrane review that estimates that point-of-use water treatment is as effective as HWWS (Clasen et al 2006). That review also confirms the effectiveness of household-based interventions is significantly greater than those at the source.

A reason for the relative low effectiveness of source water treatment interventions (11% in the chart) is the risk of microbiological contamination of drinking water during collection and storage in the home (Clasen et al 2003). A systematic meta-analysis of 22 studies measuring bacteria counts for source water and stored water in the home concludes that approximately half of the included studies identified significant contamination after water collection (Wright et al 2004). And more specifically, the decline in water quality between source and point-of-use measured in terms of faecal and total coliforms is proportionately greater where source water is largely uncontaminated (ibid.), which supports the argument for (and effectiveness of) point-of-use water treatment.

Apart from contamination between the source and consumption; that water supply interventions (25%) are of less significance to reduce diarrhoea morbidity than e.g. hand washing is said to be attribute to the fact that most endemic diarrhoeal disease is not waterborne (but transmitted from person to person on hands, food and other fomites because of poor hygiene (Cairncross 2003)). One of the reasons why water supply interventions can still be quite effective is because accessible, plentiful supplies of water facilitate and encourage better hygiene in general, and more hand-washing in particular (Curtis et al 2000). The large discrepancy between the effect of source and household water treatment presented in the chart and in the results of the meta-analysis of Wright et al 2005 supports that source water is often not the primary origin of diarrhoeal diseases, but does stress water is nonetheless a significant transmitter of diarrhoeal diseases.

Sanitation interventions are estimated to be very effective (32%). The outcome of a 2007 analysis on the effect of a city-wide sanitation programme in northeast Brazil (Baretto et al 2007) (reduction of diarrhoea prevalence for city as a whole: 22%, and in the areas where the baseline prevalence of diarrhoea was highest: 43%) strongly subscribes to the

### About the Chart

All chart data comes from Fewtrell and colleagues 2005, and are comparable to results of an earlier review done by Esrey and colleagues 1991. The latter study, however, did not include point-of-use water treatment interventions and did not isolate hand washing interventions. Fewtrell’s results on these are supported by reviews of Clasen and colleagues 2006 and Curtis and Cairncross 2003 respectively.

The studies included in the review of Fewtrell and colleagues 2005 contain the following interventions:
- Point-of-use water treatment: solar disinfection, chlorination, boiling, safe storage, and simple filtration.
- Sanitation: communal and private latrines.
- Hygiene education: measures as diverse as keeping animals out of the kitchen to advice on the correct disposal of human feaces.
- Water supply: private or communal improved supply or distribution (e.g. hand pump or household connection).
- Source Water Treatment: source protection and source treatment.

The review on sanitation thus doesn’t relate to definition of improved sanitation of the JMP on MDG & Target 10 since that definition doesn’t include communal latrines.
significance of improving sanitation facilities to reducing diarrhoea morbidity.

To target **hygiene practices other than HWWS** are estimated to be less effective than HWWS itself (25% compared to 44%). Breaking down the different barriers in the F-diagram into **primary and secondary barriers** shows that among the behavioural change alternatives, to prevent stool pathogens from gaining access to the domestic environment, efforts that focus on hand-washing after stool contact are indeed more effective, especially after defecation or after cleaning up a child (Curtis et al 2000).

Besides reviewing the impact of individual interventions, Fewtrell and colleagues also looked into the **impact of multiple intervention** and found **no evidence** for their effect to be additive. That finding is important since WASH interventions are commonly manifold. The following plausible grounds for the effects of multiple interventions not to be cumulative are brought forward (by the authors):

- The piecemeal implementation of more ambitious programmes resulting in an overall lack of focus or attention (typically for sanitation and hygiene education)
- The primary motivation of recipients (e.g. the desire to obtain a more reliable water supply)
- None of the multiple programmes in the review involved point-of-use water treatment, which might have affected the accumulative value of the water component.

Eisenberg and colleagues argue that the extent to which WASH interventions should be integrated depends on the **critical path** among the ways that enteric pathogens potentially travel to human hosts, and the consequent ways to block them (Eisenberg et al 2007), which intuitively makes sense (see box 3).

### Recommendation for integrating WASH interventions to reduce the burden of diarrhoeal disease:

In qualitative terms, Eisenberg and colleagues developed a dynamic version of the F-diagram in order to simulate the different **pathways** enteric pathogens potentially take in a community so as to determine how the efficacy of water quality interventions depends on the level of both household- and community-level transmission, and the conditions under which water quality interventions, hygiene and sanitation improvements, or both, are effective in reducing the burden of disease in a community. Their conclusion is that the benefits of a **water quality intervention** depend on sanitation and hygiene conditions. When sanitation conditions are poor, water quality improvements may have minimal impact regardless of amount of water contamination. **If each transmission pathway alone** is sufficient to maintain diarrhoeal disease, single-pathway interventions will have minimal benefit, and ultimately an intervention will be successful only **if all sufficient pathways are eliminated**. However, when **1 pathway is critical** to maintaining the disease, public health efforts should **focus** on this critical pathway (Eisenberg et al 2007).

### Additive effect of hand washing with soap on ARI?

Besides its impact on reducing the risk to contract diarrhoeal diseases, a recent study in Pakistan elucidate HWWS can **reduce** the number of pneumonia-related infections in children under the age of five by more than **50 percent** and **impetigo** by 34% (a skin disease) for children under 15. That study additionally confirms the considerable effectiveness of HWWS on reducing diarrhoea (53% for children under 15) (Luby and colleagues 2005). Acute Respiratory Infections (ARI) (mainly pneumonia) and diarrhoeal infections are the number 1 and 2 **under 5 killers** that together account for 36% of non-neonatal deaths under 5 in the world (19% and 17% respectively) (WHO World Health Report 2005). More evidence on the effect of HWWS on ARI is needed, but its potential should no longer be underestimated.

**Additive effect of hand washing with soap on ARI?**

**Source of Chart:** WHO World Health Report 2005
The argument of critical pathways relates to the primary and secondary barriers as brought forward by Curtis and colleagues 2000: primary barriers are high potential critical paths blockers. Though the critical path conceptualization allows for the analysis of more complex situations (e.g. the effect of water borne disease due to upstream contamination), the bottom-line of both articles is similar: if the interventions do not block the critical paths they are unlikely to be effective. Curtis and colleagues therefore argue there are two principal interventions ¹ that establish the primary barrier for preventing stool pathogens to enter the domestic environment: save excreta disposal and hand washing. Eisenberg and colleagues argue that when sanitation conditions are poor, water quality improvements may have minimal impact regardless of the amount of water contamination, thereby subscribing to the importance of ensuring save hygiene and excreta disposal.

The effectiveness of point-of-use water treatment seems to suggest water is another critical path. The evidence presented earlier concerning the significant deterioration in water quality from the source up to the point-of-use suggest that water can be a critical path indeed, but as a result of inadequate excreta disposal, water storage and water handling. The effectiveness of point-of-use water treatment appears to be very high. What may have been discounted as an end-of pipe solution before turns out to be an interesting measure for securing use of safe water (see WHO 2007 for more information on household water treatment and safe storage).

Nonetheless, to determine the most effective intervention in each context (or combination of interventions) to curb the prevalence of diarrhoeal diseases in a community the context’s critical paths of pathogens demands consideration.

3 Benefit/Cost Analyses

Several WHO benefit-costs analyses have been conducted showing that water and sanitation interventions grant more economic returns than they cost (cf. Hutton and Haller 2005, Hutton et al 2007A and Hutton et al 2007B for the UNDP Human Development Report 2006). These studies use different baselines and therefore all result in different outcomes, but all illuminate that investing in water and sanitation is economically beneficial. Besides investigating the benefit-cost ratios (BCR) for reaching the Water and Sanitation MDGs, they all estimate the BCR for achieving universal water and sanitation, too. The BCR is the economic return per $1 investment.

For example, the 2004 report, using a baseline of the unserved population in 2000 estimates the CBR for reaching the water and Sanitation MDG from there, comes to a global CBR for reaching the Sanitation MDG of $7, and a CBR for Sanitation and Water of $7.5. And the Hutton et al 2007 study is based on the unserved population in 1990. The WHO report written for the UNDP Human Development Report 2006 (Hutton et al 2007B) uses a very different baseline. Based on the improvement trends between 1990 and 2004, the report estimates the world will fall short of meeting the Sanitation MDG by 564 million people in 2015. Subsequently, it conducts a BCR study for serving that group of people, labelled as the population in the "countries off-track". This is a very interesting baseline since it points out what extra effort is needed to achieve the Sanitation and Water MDGs. That study specifically calculates a sanitation BCR, whereas the other studies have not isolated the benefits of investing in solely sanitation, but always grouped it together with Water (and for extraction those estimates needed to be interpolated by the reader). The data presented below is therefore based on Haller et al 2007B and represents estimates for the countries off track. In their analysis only low cost solutions are included (e.g. no sewage systems).

That WHO study found that the economic gains of meeting the Sanitation MDG in the countries currently off-track ($35 billion per annum) can primarily be attributed to non-health benefits; predominantly in saved time due to better access to sanitation facilities (90%). The below 4 tables provide a brief overview of the estimates. Although the below figures are based on average input data for regions (and therefore some caution should be maintained in interpreting results for specific country contexts), they do sketch an interesting picture. The tables about diarrhoea cases and deaths averted per age group per region form the basis for coming to the all the separate cost benefit estimates. The fact that the largest share of the total diarrhoea cases and deaths averted are subscribed to under 5 children in Sub-Sahara Africa corresponds to the fact that the largest share of countries off track are located in that region, too. In all regions the population benefiting most from achieving the water and sanitation MDG targets is the 0-4 year old group, due to a combination of the high number of diarrhoea cases and the higher case fatality rate in that age group.

¹ Among transmissions through food-borne, flies, bottle-feeding, animal feaces, water, hand washing and excreta disposal
Some of the prominent figures are extracted from the table and listed below:

Total economic benefit estimates for achieving the Sanitation MDG in the “off-track countries” $35 billion

Annual cost estimates for achieving the Sanitation MDG for the “off-track countries” $3.8 billion

Return on $1 investment in improving sanitation in the MDG “off-track countries” $9.1

<table>
<thead>
<tr>
<th>The Sanitation benefits of $35 billion are the sum of:</th>
<th>[%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health sector Benefits due to avoided illness</td>
<td>1.6</td>
</tr>
<tr>
<td>Patient Expenses due to avoided illness</td>
<td>0.2</td>
</tr>
<tr>
<td>Death avoided</td>
<td>5.0</td>
</tr>
<tr>
<td>Time Savings due to access to improved sanitation*</td>
<td>90.0</td>
</tr>
<tr>
<td>Productive work days gained of those with avoided illness (at least 15 years old)</td>
<td>3.1</td>
</tr>
<tr>
<td>+Days of school attendance gained of those with avoided illness (5-15 years old)</td>
<td></td>
</tr>
<tr>
<td>+ Baby days gained of those with avoided illness (0-4 years old)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Differentiation of benefits for achieving the MDG Sanitation in the countries of track

<table>
<thead>
<tr>
<th>World Region</th>
<th>0 to 4</th>
<th>5 to 14</th>
<th>15 - 59</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan-Africa</td>
<td>99:30</td>
<td>93:31</td>
<td>52:34</td>
<td>113865</td>
</tr>
<tr>
<td>Arab-States</td>
<td>89:16</td>
<td>79:5</td>
<td>486</td>
<td>10197</td>
</tr>
<tr>
<td>East-Asia-&amp;-Pacific</td>
<td>11:390</td>
<td>13:22</td>
<td>40:45</td>
<td>16757</td>
</tr>
<tr>
<td>South-Asia</td>
<td>26:565</td>
<td>21:62</td>
<td>24:30</td>
<td>31157</td>
</tr>
<tr>
<td>Latin-America-&amp;-Carib.</td>
<td>57:92</td>
<td>11:09</td>
<td>682</td>
<td>7582</td>
</tr>
<tr>
<td>Eastern-Europe-&amp;-CIS</td>
<td>52:5</td>
<td>20</td>
<td>79</td>
<td>624</td>
</tr>
<tr>
<td><strong>Non-OECD</strong></td>
<td><strong>15:248</strong></td>
<td><strong>14:739</strong></td>
<td><strong>12:956</strong></td>
<td><strong>180:182</strong></td>
</tr>
</tbody>
</table>

Table 2: Deaths averted due to diarrhoea by age group from achieving the Sanitation MDG target per region for countries off-track

<table>
<thead>
<tr>
<th>World Region</th>
<th>0 to 1</th>
<th>1 to 4</th>
<th>5 - 14</th>
<th>15 - 59</th>
<th>60 plus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan-Africa</td>
<td>32.4</td>
<td>44.1</td>
<td>21.7</td>
<td>13.6</td>
<td>1.3</td>
<td>113</td>
</tr>
<tr>
<td>Arab-States</td>
<td>2.9</td>
<td>4</td>
<td>1.8</td>
<td>1.3</td>
<td>0.1</td>
<td>10.1</td>
</tr>
<tr>
<td>East-Asia-&amp;-Pacific</td>
<td>3.6</td>
<td>5.2</td>
<td>3.1</td>
<td>10.5</td>
<td>1.6</td>
<td>24</td>
</tr>
<tr>
<td>South-Asia</td>
<td>8.3</td>
<td>12.2</td>
<td>5</td>
<td>6.3</td>
<td>0.8</td>
<td>32.6</td>
</tr>
<tr>
<td>Latin-America-&amp;-Carib.</td>
<td>1.8</td>
<td>2.7</td>
<td>2.6</td>
<td>1.8</td>
<td>0.2</td>
<td>9</td>
</tr>
<tr>
<td>Eastern-Europe-&amp;-CIS</td>
<td>0.2</td>
<td>0.2</td>
<td>0</td>
<td>0.2</td>
<td>0.1</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Non-OECD</strong></td>
<td><strong>49.1</strong></td>
<td><strong>68.3</strong></td>
<td><strong>34.2</strong></td>
<td><strong>33.8</strong></td>
<td><strong>4.1</strong></td>
<td><strong>189.5</strong></td>
</tr>
</tbody>
</table>

Table 3: Diarrhoea cases (millions) averted by age group from achieving the Sanitation MDG per region for the countries off-track

<table>
<thead>
<tr>
<th>Achieving MDG Targets for:</th>
<th>Achieving Universal Access to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Region</td>
<td>Water</td>
</tr>
<tr>
<td>Sub-Saharan-Africa</td>
<td>2.8</td>
</tr>
<tr>
<td>Arab-States</td>
<td>6.1</td>
</tr>
<tr>
<td>East-Asia-&amp;-Pacific</td>
<td>6.9</td>
</tr>
<tr>
<td>South-Asia</td>
<td>3.5</td>
</tr>
<tr>
<td>Latin-America-&amp;-Carib.</td>
<td>8.1</td>
</tr>
<tr>
<td>Eastern-Europe-&amp;-CIS</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>Non-OECD</strong></td>
<td><strong>4.4</strong></td>
</tr>
</tbody>
</table>

Table 4: The Benefit-Cost ratios for achieving water and sanitation MDG’s in the countries of- track and for achieving Universal water and sanitation

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2 The total number of deaths averted by meeting universal sanitation in this WHO study does not correspond to the figures of the WHO World Health Report 2005 because (among other reasons) the latter groups all causes of diarrhoeal diseases together while this study isolates the deaths averted due to improved sanitation. In addition, the numbers in this table are only for the countries off-track and the ‘malnutrition loop’ is not taken into account.
The above numbers show that investing in sanitation is **value for money**, but the value of whose money? Only 1.6% of the return on the investments is subscribed to health sector benefits. The authors conclude there is **little incentive for the health sector** to make significant contributions to the total costs. It is concluded that there should exist a variety of financing mechanisms for meeting the costs of sanitation improvements depending on:

- The income and asset base of the target population
- The availability of credit
- The economic benefits perceived by the various stakeholders
- The budget freedom of government ministries
- The presence of NGOs to promote and finance sanitation improvements

It is **controversial**, however, whether **large** public or NGO financing is **consistently** needed (and even beneficial) for increasing sanitation coverage in the developing world, for both rural and urban population (see section 6). In addition, although 98.4% of the economic benefits might be directly bestowed on the future sanitation users themselves (as are the health benefits), **household interest for improving sanitary conditions** are not found to be based on **economic grounds** (but e.g. on **privacy** and **increased social status** – see section 6). Nevertheless, the results of the sanitation benefit-cost analysis are very interesting, and if anything, they underline **governments** need to **promote** and create an enabling environment for improved sanitation. Section 5 and 6 highlight alternatives to do so.

Besides benefit/cost analyses several studies have tried to estimate the general costs for reaching MDG 7 target 10. The diverse assumptions and presumptions made in these different studies result in a lack of consistency between their outcomes. Some of these outcomes are pulled together in a briefing note (DFID 2004). This underlines when interpreting economic estimates calculated on a scope like this precaution should be taken, and that such reports need careful examination.

### 4 Cost-Effectiveness Analyses

It is not always possible to quantify all impacts in dollar units. In that case, a cost-effectiveness analysis (CEA) can be undertaken. CEA shows the cost of achieving a given output. The output is measured in its **natural unit** such as healthy life years gained, disability-adjusted life-years (DALYs) averted, or time saved. CEA is the method of choice for resource allocation decision in the health sector (Haller et al 2007). See box 4 for the definition of DALY.

<table>
<thead>
<tr>
<th>Interventions against diarrhoeal disease</th>
<th>Cost-effectiveness ratio (US$ per DALY averted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholera immunizations</td>
<td>1,658 to 8,274</td>
</tr>
<tr>
<td>Rotavirus immunizations</td>
<td>1,402 to 8,357</td>
</tr>
<tr>
<td>Measles immunization</td>
<td>257 to 4,565</td>
</tr>
<tr>
<td>Oral rehydration therapy</td>
<td>132 to 2,570</td>
</tr>
<tr>
<td>Breastfeeding promotion programs</td>
<td>527 to 2,001</td>
</tr>
<tr>
<td>Latrine construction and promotion</td>
<td>≤270.60</td>
</tr>
<tr>
<td>House connection water supply</td>
<td>223</td>
</tr>
<tr>
<td>Hand pump or stand post</td>
<td>94</td>
</tr>
<tr>
<td>Water sector regulation and advocacy</td>
<td>47</td>
</tr>
<tr>
<td>Latrine promotion</td>
<td>11.15</td>
</tr>
<tr>
<td>Hygiene promotion (including hand washing)</td>
<td>3.35</td>
</tr>
</tbody>
</table>

**Table 5**: Cost-effectiveness ratio (US$ per DALY averted). Source: Jamison et al 2006 chapter 2 p.41

A cost-effectiveness study on interventions addressing high burden diseases in Low and Middle Income Countries and on WASH interventions in particular published in 2006 (Chapter 2 and 41 of Jameson et al 2006 respectively) demonstrates some WASH interventions are among the **top most cost-effective** in averting DALYs related to diarrhoeal diseases. Moreover, it demonstrates that the differences in costs per DALY-verted among the different intervention types are **considerable** (see table 5). The costs of immunization programmes turn out to be **substantial** when balanced against programmes providing **hardware solutions** and in particular compared to programmes leading to **behavioural change**.

**DALY**

The Disability Adjusted Life Year or DALY is a health gap measure that extends the concept of potential years of life lost due to premature death (PYLL) to include equivalent years of ‘healthy’ life lost by virtue of being in states of poor health or disability (1). The DALY combines in one measure the time lived with disability and the time lost due to premature mortality. One DALY can be thought of as one lost year of ‘healthy’ life and the burden of disease as a measurement of the gap between current health status and an ideal situation where everyone lives into old age free of disease and disability.

**Box 4**

The costs of immunization programmes turn out to be substantial when balanced against programmes providing hardware solutions and in particular compared to programmes leading to behavioural change.
The results of a different cost effective study (Haller et al 2007) presented in table 6 show that disinfection of water at point of use in some regions are estimated to be as cost effective as $20 to $24 per DALY averted. It places household disinfection programmes among the top most cost-effective interventions to reduce diarrhoea. Comparing these figures with the results of intervention impacts on diarrhoea morbidity of Fewtrell et al 2005 (discussed in section 2) demonstrates there is almost a one on one correlation between the ranking of interventions’ impact to reduce diarrhoea morbidity and the cost-effectiveness of interventions to divert diarrhoea related DALYs. That does not only result from the health impact feature (as demonstrated by the cost-effectiveness of immunization programmes). Some WASH interventions simply have both: they are cheap and effective.

Haller and colleagues argue caution should be taken with interpreting cost-effectiveness figures: “Cost-effectiveness analysis is a useful tool for rational decision-making but it has its limitations and it will not provide information for all the factors which need to be taken into account. In order to select the most appropriate intervention for a particular setting, attention should be paid to the health and non-health benefits, the costs, and other parameters such as the environmental and social feasibility, and the sustainability of such an option, which are very much location-specific” (Haller et al 2007).

What should be added to the above is that though interventions might be cost-effective to avert DALYs, that might not be the reason for household members to adopt the intervention (see the following two sections). And though results of cost-effectiveness studies should help policy makers (or UNICEF offices) in making informed decisions, they are not meant for (re-)justifying top-down approaches.

5 Social Marketing

The evidence that reasons for people to reduce hygiene and sanitation related health risks are hardly ever health driven is considerable. Formative research in Kerala state in India suggests that people want to be hygienic for reasons of comfort, to remove smells, to demonstrate love for children and for social acceptability (Scott et al 2003). A study in Ghana highlights that motives for hygiene behaviour can be classified in desires to nurture, to void disgust and the desire to gain social status (Scott et al 2007). Health considerations are not among the top reasons for rural householders in the Philippines and Benin to be satisfied about their new latrines either (see box 5). That awareness, supported by the struggle and failure of conventional education and supply-side hygiene and sanitation interventions to bring about large-scale behavioural change in the past 25 years, has created interest in using marketers to trigger behavioural change.
Social marketing is the application of marketing to achieve behaviour change for social good, and has previously been exploited in public health to achieve large-scale changes in health-related personal and household behaviours (e.g. use of bed nets to prevent malaria, condoms to prevent HIV, household disinfectant to treat drinking water) (Jenkins and Scott 2007). The objective of social marketing can bring together two sectors to pool resources which normally have different responsibilities: The public and private sector.

Hand Washing with Soap

Social marketing initiatives have proven to be successful in establishing the behavioural change that has so been difficult to achieve with conventional hygiene education programmes. The results of a campaign that involved a marketing approach to stimulate HWWS in Ghana reported that hand washing rates from baseline to follow-up increased by 13% after using the toilet and by 41% before eating (Curtis et al 2007). The Public-Private Partnership for Hand washing (at www.globalhandwashing.org), with the objective to reduce the incidence of diarrhoeal diseases in poor communities through Public-Private Partnerships (PPPs) promoting hand washing with soap, has initiated and reviewed PPP’s for hand washing. Their website is very resourceful and, among others, the website contains the following documents:

- Public-Private Partnerships for Health: A Review of Best Practices
- The Handwashing Handbook: A Guide for Developing a Hygiene Promotion Program to Increase Hand washing with Soap
- Health in Your Hands: Lessons from Building Public-Private Partnerships for Washing Hands with Soap

See box 6 for a conclusion on social marketing taken from a study on hand washing in Ghana.

Sanitation

A brief but comprehensive field note on the use of social marketing to promote household latrine adoption has been written by Sandy Cairncross (Cairncross 2004). The reasons to market sanitation are described as follows:

- Marketing ensures that people choose to receive what they want and are willing to pay for.
- Marketing is financially sustainable
- Marketing is cost-effective and can be taken to scale
- Provision of hardware is not enough (those who buy a latrine will use and maintain it, opposed to subsidized latrines)

The ‘4P’ marketing approach suggested in that document (Product, Price, Place and Promotion) has been extend with a fifth ‘P’ (Policy) by Scott and Jenkins, as frequent local or national governments’ policies can constrain the sanitation marketing process (Scott and Jenkins 2005). The fifth ‘P’ relates to Cairncross’

Hopes and Desires: Marketers

Hygiene promotion is unlikely to be successful unless its messages are based upon the hopes and desires of the target population, an idea central to marketing. By borrowing techniques from industry, by investigating target audiences as consumers expected to make behavioral choices on a range of factors, including but not only health, we were able to propose novel means to promote safe hand washing behaviors. The nationwide program based on these approaches that is now up and running will be the target of intensive scrutiny, and lessons as to what works and what does not in changing behavior will be learnt. In the meantime, formative research offers a powerful tool in the hands of experienced researchers, to lay the ground work for effective behavior change programs. To successfully promote healthy hygiene behaviours we need a shift in our approach, to learn from marketers and, more importantly, from our target audiences themselves. Health may be in our hands, but it is not always in our heads.

Source: Scott et al 2007

Six suggested recommendations as hypotheses for testing in the development of marketing approaches for sanitation in Benin:

1. Advertising campaigns should associate latrines (or other sanitation solutions) with positive values
2. The use of scientific explanations of disease transmission to promote latrines should be avoided
3. Improving latrine designs to enhance attributes important to drive satisfaction could increase their desirability over competing alternatives and lead to broader choices for consumers
4. Bundling the promotion of latrines with other highly desired housing improvements maybe an effective way to raise the image of latrines
5. Recognizing that different lifestyles and village environments give rise to different drives or dissatisfactions
6. Certain population groups maybe very unlikely to adopt latrines, no matter how much promotion is done, and should therefore not be targeted.

Source: Jenkins and Curtis 2005
idea of state involvement in marketing sanitation. The subsequent new role of the public sector is presented in Box 8. In a different article analyzing determinants of new demand for latrines in Ghana, Jenkins and Scott argue for the use of a strategy that uses marketing along with two other primary tools for behaviour change – education and law – to achieve public social or health goals, because marketing alone can not overcome all the constraining factors blocking latrine adoption (Jenkins and Scott 2007). The bottom-line is that the public sector should definitely not merely hand over sanitation improvement responsibilities to the private sector, but should become a champion in enabling the private sector to serve consumers efficiently. The initiation of a Public Private Partnership between governments and the private sector could facilitate this process.

Collaboration between the two inherently sheds light on different responsibilities between the public and private sector (the public sector has an interest to provide services for all, or in particular the poor, and not only those that can afford a latrine). A recommendation done by Jenkins and Curtis for development of marketing approaches in Benin states that: “Certain population groups maybe very unlikely to adopt latrines, no matter how much promotion is done, and should therefore not be targeted” (see recommendation no. 6 in box 7).

Cairncross does allow for the conditional use of subsidies e.g. to offer low interest rate on loans, or to temporarily attract attention to the launch of a new marketing campaign, or to subsidize businesses that provide sanitation facilities and that wish to expend. “Subsidies should [however] never be applied in a way which undermines the existing private providers in the market”. Nevertheless “constant monitoring of the working of the market is needed to ensure that public efforts and resources invested in the sector continue to benefit the unserved, and not only the privileged” (Cairncross 2004).

The evaluation of social marketing approaches to sanitation can provide insights in the feasibility of the above. Nevertheless, whether or not mechanisms are found that ensure the poorest of the poor will be served by the market; if the market is able to sell latrines to only 10% of the households that currently do not benefit from improved sanitation, it should do so. Box 9 illustrates the potential of a joint initiative between the public and private sector in Ghana could have to increase latrine demand.

What is important to bear in mind is, as section 3 pointed out, most of the economic benefits of improved sanitation are for the users themselves, and not for the health sector (the health sector benefits are only estimated to comprise 1.6% of the total economic return). That figure supports the idea to let the market give it a try, too.
Community-Led Total Sanitation

This approach to making an end to open defecation is considered to be a major breakthrough in the world of sanitation (and one that gives hope, too). It has shown to be able to trigger rural communities to step up the first rung on the improved sanitation ladder, collectively. It has bypassed the ‘intellectual constipation’ apparent in both the technology as well as the methodology spheres of the international development community. And two of its major grounds for success illuminate an awakening paradox: The reason why old-school and contemporary participatory latrine programmes have found it so difficult to trigger each household in a community to adopt a latrine is not because community members do not understand the messages about the health benefits of improved sanitation, and they do not reject latrines because of the limited hardware subsidies on latrines: those programmes struggled because they prioritise health messages and subsidies.

The key to success is that collective sense of disgust and shame are primary instigators for change: not health. It is so strong that it can ignite whole communities to abandon open defecation practices and to construct latrines at each household without any external hardware subsidy. Consequently, communities are declared Open Defecation Free (ODF).

Several country offices of UNICEF have experience with his approach, which are briefly documented on the UNICEF web pages:

- Pakistan: http://www.unicef.org/pakistan/media_2875.htm
- India http://www.unicef.org/india/wes_2939.htm

WES specialist might feel that CLTS is just another Participatory Learning and Action (PLA) tool that is not so different from what the sector has seen before (like Participatory Hygiene and Sanitation Transformation Tool (PHAST)). And although in CLTS you will generally find the same rationale as in other PLAs (self-aware responsibility, equity and empowerment, diversity, the new role of the facilitators) the transformation process has seemingly minor yet key differences:

- The entry point is not health, but shame
- Household latrine adoption is not the target - the target is community-wide household latrine adoption
- There is no predefined latrine design (or a portfolio) – the villagers design and construct their own latrines
- There is no subsidy on any of the latrine construction stages – the villagers help themselves and each other

It is strongly advised to read the above IDS papers as besides explaining how the methodology was used in Bangladesh, they also address critical issues emerging from the spread of the methodology: sustainability and innovations, institutional dilemmas and challenges and opportunities. Among those are the problems encountered with scaling-up of CLTS, the applicability of the methodology in (peri)-urban settings and the continuous obstructive nature of subsidized latrine programs on collective transformations persistently sustained by many development actors.

Despite its potential, there is a call for caution. The methodology’s “myth of success” (IDS 257 p.13) is in actual fact pointed out as one of the dangers for failure. CLTS cannot be a top-down, ‘one size-fits-all’ standard model driven by targets and disbursements. Local innovation and creativity need to be fostered and supported, and slow small scale starts are needed for learning, adapting and developing cadres of facilitators if its spread is to be exponential to achieve it’s potential” (ibid.). Only in Bangladesh it is estimated that more than 10.000 paras, triggered by CLTS, have made their community Open Defecation Free. And in, among others, Cambodia, China, India, Indonesia, Nepal, The Gambia, and Zambia CLTS has been introduced, too.
7 Conclusion

This section shortly recaps on the figures presented in the above sections. Thereafter it will draw a conclusion. This document will not argue for the best measure (or combination of measures) and best methodology to be used in the field.

Effectiveness in reducing diarrhoea morbidity:

Analysis of the potential barriers to block transmission paths of enteric pathogens to enter the household domain substantiate the high effectiveness of hand washing with soap and safe excrete disposal (sanitation) interventions. In addition, hand washing with soap has been found to be very effective in averting pneumonia cases (up to 50%). The results of a meta-analysis regarding point-of-use opposed to source water contamination levels explain the effectiveness of point-of-use water treatment. And though point-of-use water treatment does not tackle the origin of contamination, its effectiveness makes it a very interesting measure. To determine the most effective intervention in each context (or combination of interventions) to curb the prevalence of diarrhoeal diseases in a community the context’s critical paths of pathogens demands critical consideration:

"When sanitation conditions are poor, water quality improvements may have minimal impact regardless of amount of water contamination. If each transmission pathway alone is sufficient to maintain diarrhoeal disease, single-pathway interventions will have minimal benefit, and ultimately an intervention will be successful only if all sufficient pathways are eliminated. However, when 1 pathway is critical to maintaining the disease, public health efforts should focus on this critical pathway”

Eisenberg and colleagues 2007

Benefit-Cost Analysis

<table>
<thead>
<tr>
<th>Description</th>
<th>Benefit Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total economic benefit estimates for achieving the Sanitation MDG in the “off-track countries”</td>
<td>$35 billion</td>
</tr>
<tr>
<td>Annual cost estimates for achieving the Sanitation MDG for the “off-track countries”</td>
<td>$3.8 billion</td>
</tr>
<tr>
<td>Return on $1 investment in improving sanitation in the MDG “off-track countries”</td>
<td>$9.1</td>
</tr>
<tr>
<td>The largest share of economic benefits of achieving the Sanitation MDG are subscribed to time savings due to better access:</td>
<td>90% of total</td>
</tr>
<tr>
<td>The share of the total economic benefit of meeting the Sanitation MDG in the countries off track that profit the health sector:</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

The two last figures raise the question as to who should invest in sanitation. The estimates of benefit/cost studies on a scale like this should be carefully examined.

Cost-effectiveness in DALYs

WASH interventions are among the top most cost-effective in averting DALYs related to diarrhoeal diseases. Moreover, it demonstrates that the differences in costs per DALY-verted among the different intervention types are considerable (see table 5). The costs of immunization programmes turn out to be substantial when balanced against programmes providing hardware solutions and in particular compared to programmes leading to behavioural change. **Disinfection of water at point of use** are for some regions estimated to be as cost effective as **$20 to $24 per DALY averted**. It places household disinfection programmes among the top most cost-effective interventions to reduce diarrhoea.
There is **almost a one on one correlation** between the ranking of interventions’ impact to reduce diarrhoea morbidity and the cost-effectiveness of interventions to divert diarrhoea related DALYs: Some WASH interventions are both effective and cheap.

<table>
<thead>
<tr>
<th>Interventions against diarrhoeal disease</th>
<th>Cost-effectiveness ratio (US$ per DALY averted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholera immunizations</td>
<td>1,658 to 8,274</td>
</tr>
<tr>
<td>Rotavirus immunizations</td>
<td>1,402 to 8,357</td>
</tr>
<tr>
<td>Measles immunization</td>
<td>257 to 4,565</td>
</tr>
<tr>
<td>Oral rehydration therapy</td>
<td>132 to 2,570</td>
</tr>
<tr>
<td>Breastfeeding promotion programs</td>
<td>527 to 2,001</td>
</tr>
<tr>
<td>Latrine construction and promotion</td>
<td>≤270.00</td>
</tr>
<tr>
<td>House connection water supply</td>
<td>223</td>
</tr>
<tr>
<td>Hand pump or stand post</td>
<td>94</td>
</tr>
<tr>
<td>Water sector regulation and advocacy</td>
<td>47</td>
</tr>
<tr>
<td>Disinfecting water at point-of-use</td>
<td>20 - 24&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Latrine promotion</td>
<td>11.15</td>
</tr>
<tr>
<td>Hygiene promotion (including hand washing)</td>
<td>3.35</td>
</tr>
</tbody>
</table>

**Methodologies and Conclusions**

The figures on this page highlight that Governments, Donors, NGO’s, other partners and international institutes interested in reducing diarrhoea morbidity in the developing world have a portfolio of arguments to draw upon WASH interventions to do so. These arguments are strongly captured in the 5 key messages for the International Year of Sanitation:

- Sanitation is vital for human health
- Sanitation leads to social development
- Sanitation is a good economic investment
- Sanitation helps the environment
- Sanitation is achievable

The evidence from research about the motives for people to adopt hygienic behaviour, the success of social marketing to exploit that and the success of a methodology that uses the collective sense of disgust as the driver for community-wide change (all section 5 and 6) interestingly prove that not all the 5 key messages are suitable for igniting processes of change on the ground. On the contrary, there is incremental evidence that it’s the power of dignity, comfort, care, privacy, social acceptability and safety that creates incentives to transform behaviour. All the 5 key messages can be used to persuade Governments, Donors, NGO’s, other partners and international institutes to take a lead in using WASH interventions to curb the prevalence of diarrhoeal diseases in the developing world. Key message #2, sanitation leads to social development, however, has the right angle to make it happen on the ground. These considerations are not irrational, they draw upon a different rationality; one that even marketers are familiar with.

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<sup>3</sup> Data only or Africa Den E
8 Global Sanitation Facts

Urban & rural population globally using improved sanitation in 2004

Urban & rural population globally without improved sanitation in 2004

People without improved sanitation services in 2004

Expected world population in 2015

People without improved sanitation in 2015 if MDG is achieved

People that need to gain access to improved sanitation in the decade from 2004 – 2015 to meet the MDG

The degree the world falls short of meeting the sanitation target in 2015 if current trends continue

9 Facts on Sanitation and Children

Children under 18 without access to an improved sanitation facility

Number of children under 5 living in households without access to improved sanitation facilities

Daily child deaths under age five from diarrhoeal diseases in 2004:

Annual number of deaths of children under 5 due to diarrhoeal diseases

WASH related diarrhoeal deaths per year of children under 5:

% of diarrhoeal deaths related to WASH:

% of total under five child mortality due to diarrhoea:

Diarrhoea as proportionate cause of child mortality:
Effectiveness of WASH interventions to reduce diarrhea morbidity


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Health in Your Hands: Lessons from Building Public-Private Partnerships for Washing Hands with Soap
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